IN THE CLAIMS:

1. (Original) A method for generating and detecting ultrasonic surface displacements on a remote target comprising the steps of:

using a first pulsed laser beam to generate ultrasonic surface displacements on a surface of the remote target;

using a second pulsed laser beam coaxial with said first pulsed laser beam to detect the ultrasonic surface displacements on the surface of the remote target;

collecting phase modulated light from the second pulse laser beam either reflected or scattered by the remote target; and

processing the phase modulated light to obtain data representative of the ultrasonic surface displacements on the surface of the remote target.

2. (Original) The method of Claim 1 wherein the step of processing the phase modulated light further comprising the steps of:

using an interferometer to demodulate the phase modulated light for creating at least one optical signal;

converting the at least one optical signal into at least one digital signal; and

using a digital signal processor to process the at least one digital signal.

3. (Original) The method of Claim 2 wherein the step of converting the at least one optical signal into at least one digital signal further comprising the steps of:

converting the at least one optical signal into at least one analog signal; and

converting the at least one analog signal into at least one digital signal.

4. (Currently Amended) [A] An apparatus for generating and detecting ultrasonic surface displacements on a remote target comprising:

a first pulsed laser to generate a first pulsed laser beam to produce ultrasonic surface displacements on a surface of the remote target;

a second pulsed laser to generate a second pulsed laser beam coaxial with said first pulsed laser beam to detect the ultrasonic surface displacements on the surface of the remote target;

collection optics for collecting phase modulated light from the second pulsed laser beam either reflected or scattered by the remote target;

an interferometer to process the phase modulated light and generate at least one output signal; and

a processor to process the at least one output signal to obtain data representative of the ultrasonic surface displacements on the surface of the remote target.

5. (Original) The apparatus of Claim 4 further comprising an intensity controller to adjust on a pulse-by-pulse basis the intensity of the second pulsed laser beam in proportion to the intensity of the phase modulated light collected by the collection optics.

6. (Original) The apparatus of Claim 4 wherein the first pulsed laser emits a laser beam of coherent light of about 10 microns in wave length.

7. (Original) The apparatus of Claim 4 wherein the interferometer is self-stabilized using substantially 100% of the phase modulated light delivered to the interferometer by the collection optics.

8. (Original) The apparatus of Claim 4 further comprising an optical ranging unit to calculate a distance by which the remote target is separated from the apparatus.

9. (Original) A large area composite inspection apparatus for measuring ultrasonic surface displacements on a surface of a remote target comprising:

a detection laser to generate a pulsed laser beam to detect the ultrasonic surface displacements on the surface of the remote target;

collection optics for collecting phase modulated light from the pulsed laser beam either reflected or scattered by the remote target;

an interferometer to process the phase modulated light collected by the collection optics;

said interferometer comprising: a first cavity having a first confocal lens structure; a second cavity having a second confocal lens structure; a device for dividing incoming de-polarized light into a first polarized light component and a second polarized light component wherein said device also directs said first and second polarized light components into the first and second cavities;

a control system to adjust said first and second cavities such that a ratio of light transmitted through each cavity to light reflected back through each cavity remains substantially constant; and

a processor to process the light transmitted through the first cavity, the light reflected back through the first cavity, the light transmitted through the second cavity, and the light reflected back through the second cavity, all in order to obtain data representative of the ultrasonic surface displacements on the surface of the remote target.

10. (Original) The large area composite inspection apparatus of claim 9 further comprising an intensity controller which adjusts on a pulse-by-pulse basis the intensity of the pulsed laser beam in proportion to the intensity of the phase modulated light collected by the collection optics.

11. (Original) The large area composite inspection apparatus of claim 9 further comprising a positioning apparatus to move the detection laser across the surface of the remote target and then record and index the data detected by the large area composite inspection apparatus.

12. (Original) The large area composite inspection apparatus of claim 9 wherein the positioning apparatus is a gantry positioning apparatus.

13. (Original) The large area composite inspection apparatus of claim 9 further comprising a generation laser to generate a pulsed laser beam to detect generate the ultrasonic surface displacements on the surface of the remote target.

14. (Original) The large area composite inspection apparatus of claim 9 wherein the generation laser and the detection laser coaxially apply laser beams to the surface of the remote target.

15. (Original) A method for generating and detecting ultrasonic surface displacements in a remote target comprising the steps of:

generating ultrasonic surface displacements in the remote target;

directing a pulsed laser beam to detect the ultrasonic surface displacements on the surface of the remote target;

collecting light from the pulsed laser beam either reflected or scattered by the remote target;

processing the light collected from the remote target using an interferometer;

said interferometer comprising: a first cavity having a first confocal lens structure; a second cavity having a second confocal lens structure; a device for dividing incoming de-polarized light into a first polarized light component and a second polarized light component wherein said device also directs said first and second polarized light components into the first and second cavities; a control system to adjust said first and second cavities such that a ratio of light transmitted through each cavity to light reflected back through each cavity remains substantially constant; and a plurality of detectors to detect the light transmitted through the first cavity, the light reflected back through the first cavity, the light transmitted through the second cavity, and the light reflected back through the second cavity, all in order to obtain data representative of the ultrasonic surface displacements on the surface of the remote target.

16. (Original) The method of claim 15 further comprising the step of adjusting on a pulse-by-pulse basis the intensity of the pulsed laser beam in proportion to the intensity of the light collected from the remote target.

17. (Original) The method of claim 15 further comprising the step of indexing the detection laser across a surface of the remote target and then recording the data on a point-by-point basis.

18. (Original) The method of claim 15 wherein the step of generating ultrasonic surface displacements in the remote target is accomplished a generation laser beam.

19. (Original) The method of claim 15 wherein the pulsed laser beam and a beam of the generation laser are coaxially applied to the surface of the remote target.